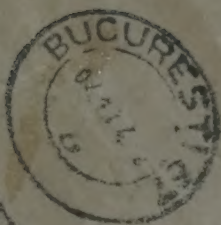


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TAKE PERCUE



A CHILD'S BOOK OF

# Rocks and Jewels

by  
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(91)

11/21 CHILDREN SECTION  
55D B





# COAL

Next to soil and water, coal is the most useful material taken from the earth. At first it was used to make heat and power, but now many things are made from it. From black coal come bright-coloured dyes, chemicals, medicines, plastics, rubber, oils, and hundreds of other things.

Millions of years ago ferns and trees fell into swampy ground and became pressed into a *sedimentary* rock called bituminous, or soft coal. Today, miners go deep beneath the surface to mine it. Electric lamps on their helmets light the way in the darkness. In some places coal is near the surface where it is scooped up by big electric shovels.

Wherever soft coal has been squeezed very greatly, it has been changed into anthracite, or hard coal. It has become a *metamorphic* rock. If squeezed still more, it becomes a mineral, graphite. Coal, graphite, and diamonds are different forms of the same material, carbon. Coal is often called "black diamonds".







## GRAPHITE

Graphite is one of the softest minerals and is light in weight. It is black with a metallic lustre. When rubbed on paper it leaves a greyish-black mark.

Graphite is pure carbon in the form of grains, scales, flakes or thin, flat crystals found in *igneous* and *metamorphic* rocks. It can sometimes be seen as tiny black crystals in marble.

Graphite is produced commercially in Russia, Germany, Austria, Madagascar, and in Ceylon, where the largest masses are found. It is used in crucibles, furnace linings for foundries, and in paints. Because it is smooth and resistant to heat, it is a lubricant for high-speed machinery.

Extensive deposits in Mexico provide most of the "lead" for pencils.

## SANDSTONE

Before sandstone became a rock it was just an ocean sandbank or river bed of sand. It is a *sedimentary* rock made up of grains of quartz which nature cemented together with various other minerals such as lime, silica, or iron.

The colour of the grains and the cement determine the colour of sandstone. Where sand grains were mixed with grey, green or red minerals, the rock now has these colours. Iron is a common cementing mineral, colouring sandstone yellow, brown, red or pink. You can see an illustration of red sandstone cliffs inside the front cover of this book.

Sandstone is found all over the world. It can be quarried in regular blocks and easily shaped for building. Dinosaur footprints are often found on the rock slabs from sandstone quarries.



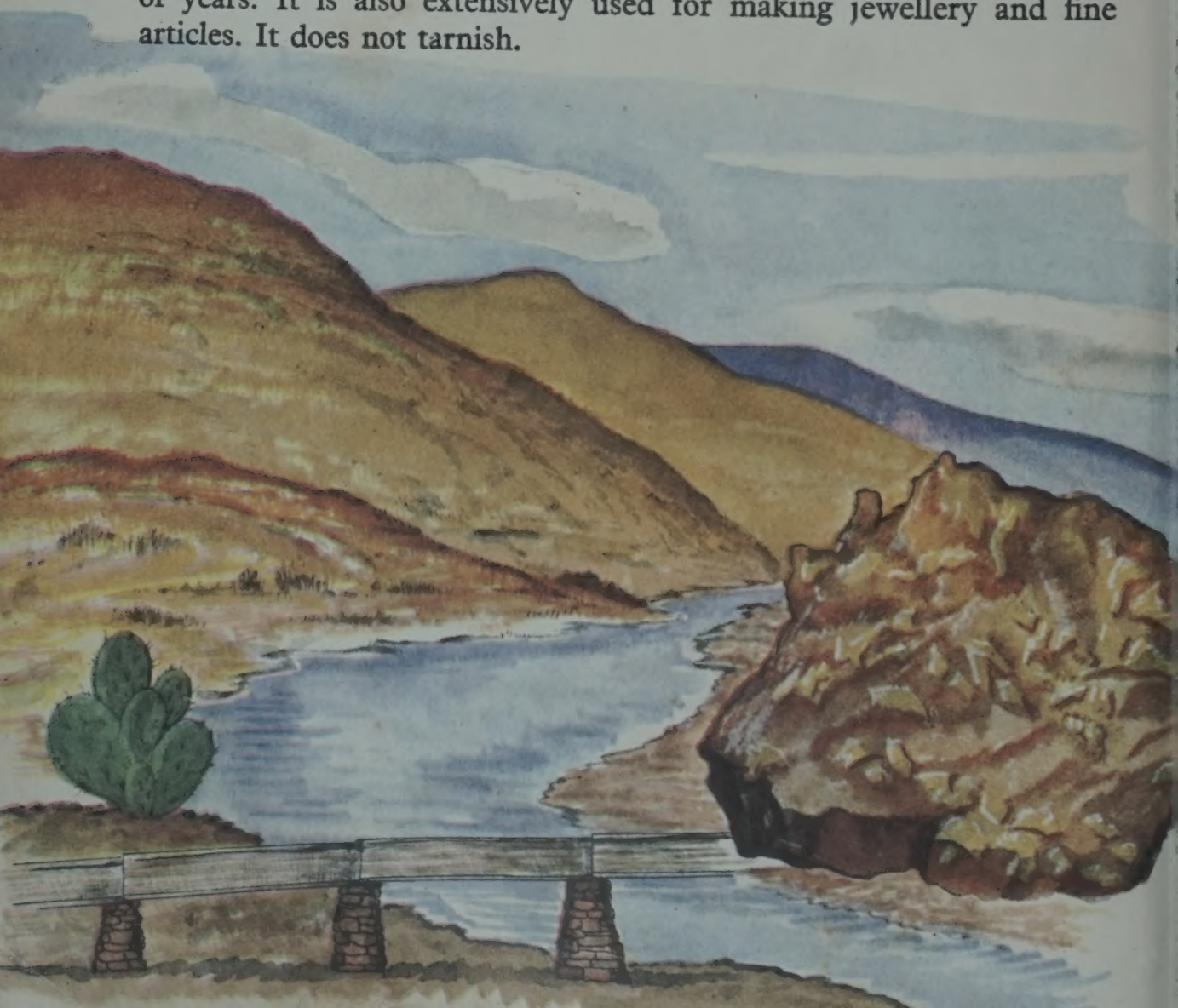


# GOLD

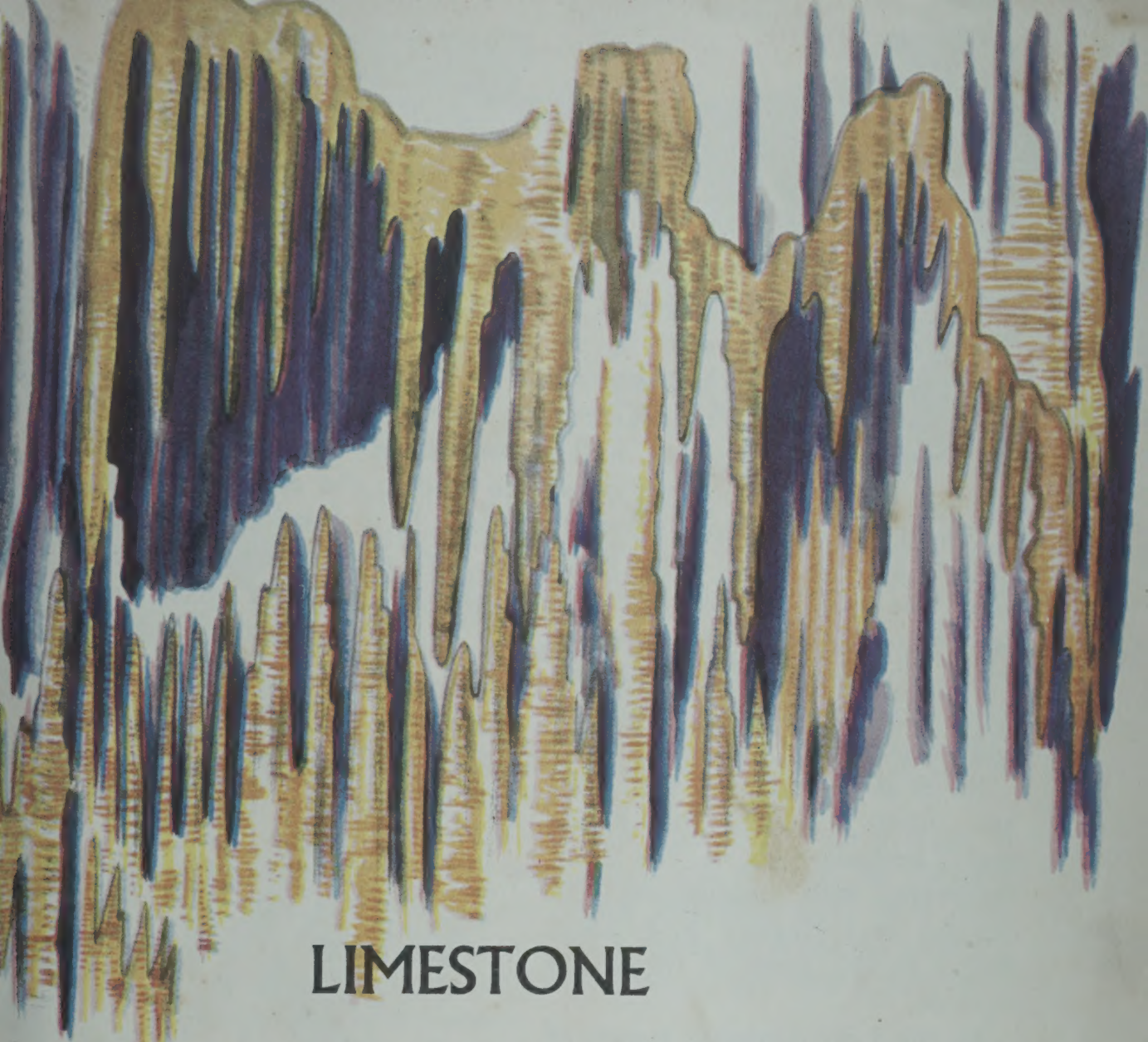
Gold is a rich yellow metal. It is heavy, soft and easily worked, and was one of the first metals to be used by primitive man. Its bright yellow colour attracted the eye. Ornaments of gold have been found in the ruins of the earliest civilizations.

Gold is found in streams in the form of grains, nuggets or flakes, sometimes as fine as powder. In river bottoms, prospectors pan for it, and dredges are used to dig for it. The gold particles are washed out of the gravel. In rocks, gold is found in quartz veins as lumps, thin wires, or flakes. The ore is mined and crushed, then washed to leave the gold behind. The California and Klondike gold rushes started when gold dust and pebbles were discovered in river beds.

For money, or as a money standard, gold has been used for thousands of years. It is also extensively used for making jewellery and fine articles. It does not tarnish.



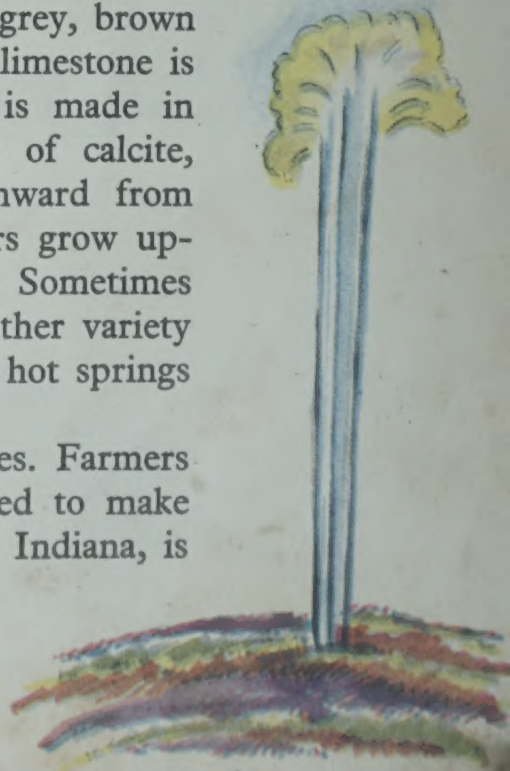




# LIMESTONE

Limestone is composed of a mineral called calcite. It is a *sedimentary* rock made of tiny grains which settled on the sea floor. When impurities do not make it grey, brown or black, it is white or cream-coloured. Some limestone is thick with fossil sea shells. Another variety is made in caves, by trickling water depositing particles of calcite, forming long stone icicles which grow downward from the ceilings. These are called stalactites. Others grow upward from the floor and are called stalagmites. Sometimes the two forms meet to make a pillar. Still another variety of limestone is formed around the openings of hot springs and geysers.

Limestone has many important industrial uses. Farmers use it to make soil more productive. It is used to make cement and concrete. A variety from Bedford, Indiana, is one of the finest building stones.







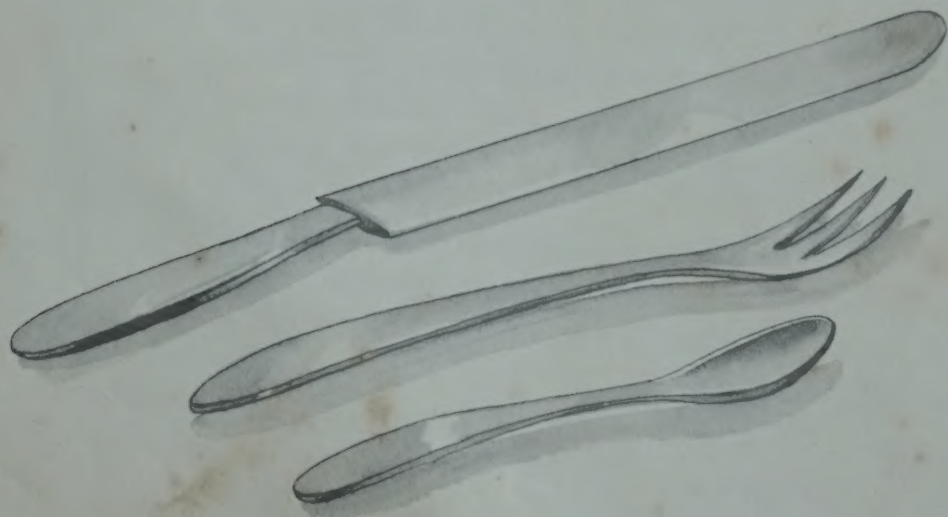
## SILVER SILVER

Silver is a bright white metal. In its native state it is rough and tarnished. Tarnish blackens silver so that it did not attract the eye of man as early as did gold. But it has been well known from the earliest times.

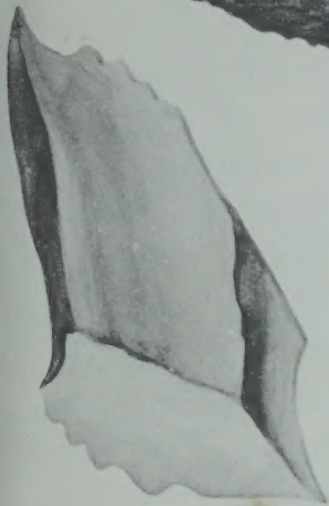
Silver is next to gold in the ease with which it can be worked. Some silver ornaments have been found in the ruins of ancient Troy, where they were worn 4,500 years ago. Later, silver was used for basins, vases and dishes. Now, silver mixed with harder metals is used also to make tableware such as knives, forks, spoons, and for jewellery and coins.

Silver is often found with gold and other minerals. In Canada and Czechoslovakia it has been discovered with uranium ores. In Mexico and Norway it is often found in the form of wires and crystals.

In the Lake Superior region of the United States it is found with masses of native copper. Mexico is another important producer, and visitors to Mexico usually leave with handmade silver ornaments.







## FLINT

Flint is a brittle compact mineral. It looks like dull glass and feels smooth and waxy. In colour it is usually brown, grey or black. It is a form of impure quartz.

Flint is found among the rocks of every geological age. There are many flint pebbles on ocean beaches and in river beds. Some of the finest flint comes from the chalk deposits of England and France where it occurs in lumps or layers.

Men of the Stone Age learned to chip flint to thin sharp edges to form arrowheads, knives, axes, spear points and scrapers for dressing skins. Flint chipping was an art. Many beautiful tools have been found in ancient camp sites and villages. Even today farmers ploughing their fields and boys digging in the woods can find flint arrowheads made by our primitive ancestors.

Before the invention of matches, flint was valued for its spark when struck by steel. Flintlock guns, such as soldiers used two hundred years ago, were fired by a hammer striking a piece of flint. Early man struck flint with flint to start a fire.

Because it is very hard, easily shaped, and found in many parts of the world, flint was one of the most important stones in the early history of civilization.







# COPPER

The mineral, copper, is a reddish metal. When cave-men found pebbles of copper, which they could pound and carve into axe heads, human history moved from the Stone Age into the Age of Metals. The Egyptians and Romans learned to melt and mix copper with tin to make bronze, and with zinc to make brass. These mixtures, called alloys, are stronger than pure copper. The Indians of North America found pure copper in the Lake Superior region, which they hammered into tools and ornaments.

Green and blue stains on rocks can lead prospectors to copper deposits. In this way the great Kennecott mines in Alaska were discovered accidentally on a mountain-side. Copper ore is mined as deep as a mile underground.

Copper is a good conductor of electricity and therefore is used in making wires and cables. It is also used to strengthen aeroplane bodies and in an alloy for bells and chimes. In the British Isles copper is made into pennies, motor-car radiators, and water pipes.

The United States produces about a quarter of the world's supply of copper. Chile is another important source, producing about 17 per cent.







## MARBLE

Most marble began as limestone which nature changed by pressure and heat. It is a *metamorphic* rock. The crystals in marble are so small that they look like sugar. Pure marble is white. Iron and other minerals stain marble grey, buff, yellow, red or black. The coloured veins and “marbled” patterns show us how the rock was pressed when it was being formed.

Marble cuts easily and takes a high polish. It is a beautiful building stone. Architectural marble has uniform texture and colouring, and may be any colour. This is cut into thin slabs, as well as blocks, and used for columns, walls, floors and steps. Sculptors use the purest and whitest marble for carving statues.

Marble is found in Canada, the United States, Greece, Germany, Switzerland, Scandinavia and many other parts of the world. For 2,000 years the beautiful marble of Carrara, Italy, has been used for statues and buildings.

The magnificent marble building shown above is the Taj Mahal in Agra, India. It was built over 300 years ago by an Indian ruler as a tomb for his wife.







# SALT

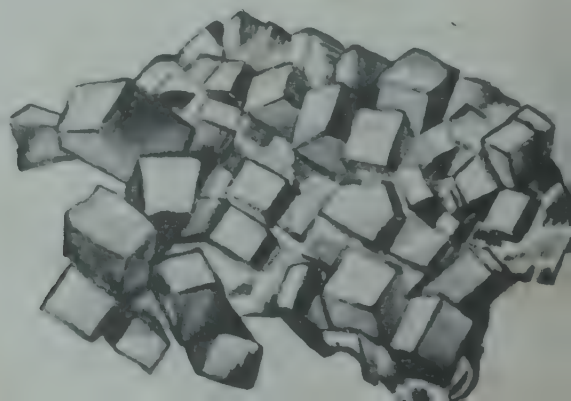
Salt is a soft mineral. Its crystals are four-sided. Often the crystals form huge blocks. When pure, salt is colourless and transparent, but you can't mistake its taste.

Man and animals could not live without salt. It exists in the air, in water, in plants, and in your blood. Hunters know that they will find animals near "salt licks". Farmers put out blocks of salt for cows to lick and in some areas wild deer come there too. Salt is used for seasoning and for preserving food.

Some ancient seas were dried up by changing climates. The waters evaporated and left hard beds of salt which we call rock salt. Rivers wash salt into the seas. If the water evaporates, the salt is left behind. Landlocked seas like Great Salt Lake in North America and the Dead Sea in Palestine evaporate rapidly and are therefore saltier than the ocean. The Dead Sea is eight times as salty as ocean water.

Salt is mined like coal or quarried when it is near the surface. Salt from very deep underground beds is obtained by flooding. The water dissolves the salt and forms brine which is pumped to the surface. There it is allowed to evaporate in huge vats, leaving the granular salt.

Dissolve a little salt in water. Then leave it in a shallow dish in the sun. When the water is gone, you will see the salt again.





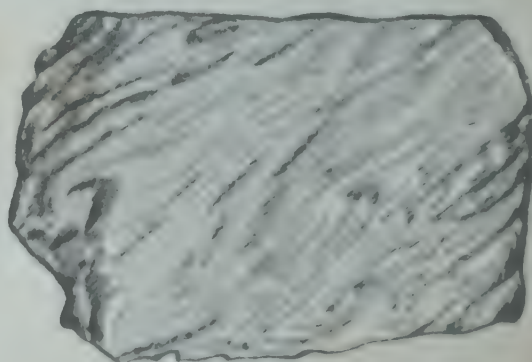
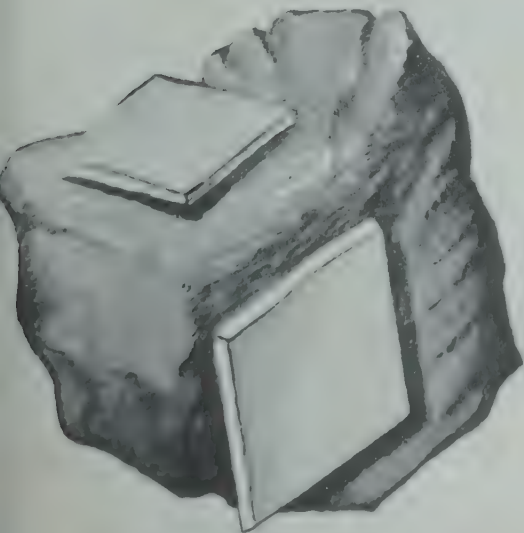


## MICA

Mica is a mineral that splits into thin, tough, transparent sheets. The flat side is bright and shiny. It looks like glass but is not as hard and will not break when it is bent. Sheet mica is found in *igneous* and *metamorphic* rocks, and tiny flakes of it in *sedimentary* rocks. Sometimes other minerals and precious stones, like garnets, are found with sheets of mica. The colour of mica varies from silver-white through grey, pink and green to black. When you look at coarse granite you may see tiny flakes of mica.

Mica will not burn. It is used for insulation in radio valves, toasters, and other electrical equipment. The artificial snow on your Christmas tree and greeting cards is made of tiny mica scraps. It is also used to make snowstorms on the films. Mica also goes into roofing, wallpaper and stage scenery. White mica is sometimes called isinglass and is still used in the windows of oil and iron stoves. Long ago in some countries large sheets of mica were used instead of window glass.

Mica occurs throughout the world, as large masses or tiny crystals. India produces most of the white mica used in industry.





# CINNABAR

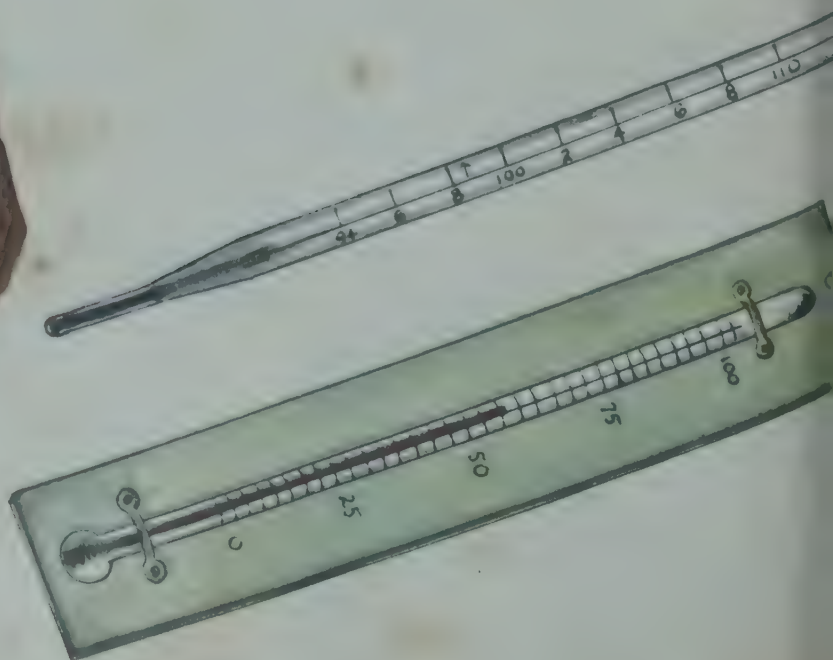
Cinnabar is a mineral and the principal ore from which mercury is obtained. Its colour varies from scarlet to brownish red and may fade to a dull grey. A scarlet streak is its most distinctive characteristic. It is heavy.

Mercury is the only metal which is liquid at normal temperatures. It is sometimes found in free form as tiny drops or in a thin film in small rock cavities. Both mercury and its ore, cinnabar, are found in regions where volcanoes or hot springs were once active.

Since mercury freezes at very low temperatures and responds quickly to changes, it is used in instruments for measuring temperatures and the weather. In many thermometers you can see the silvery-white liquid that goes up and down

Sometimes mercury is called quicksilver. If a drop falls on a gold or a silver coin it runs over it instantly leaving behind a "silver" coating. Mercury is used in medicines, explosives, and in paint for ship bottoms because it is poisonous and helps to keep off the barnacles.

The leading producers of mercury are Spain, Austria, Yugoslavia, Italy and the United States.







# AGATE

Agate is a variety of quartz. Water seeping through the rocks leaves layers of silica in cracks and lava bubble holes, forming the wavy, irregular stripes for which agate is known. When the rocks surrounding agates have been worn away, the agates are left on the ground or found as stones and boulders in rivers. It looks glassy and is quite hard.

Agate colours range from white to grey, green, orange, red and brown. Because of their beauty, agates are used for jewellery and art

objects. Boys' marbles used to be made of agate, but now they are imitated in glass.

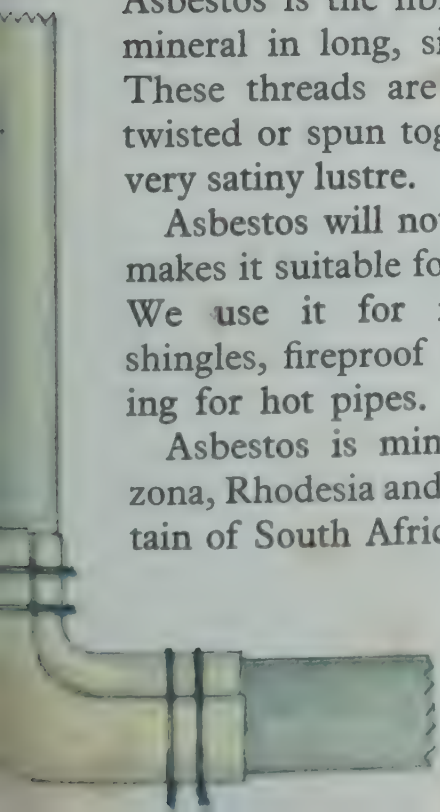
The best agates come from cavities in basaltic rock in Brazil, Uruguay and the United States. They are also plentiful in ancient lavas of New South Wales and in South Africa. Worn agate pebbles are found on English beaches.

# ASBESTOS

Asbestos is the fibrous portion of the rock called serpentine. It is a mineral in long, silky fibres that can be picked apart like threads. These threads are flexible and tough enough so that they can be twisted or spun together. It is white, green or grey in colour, with a very satiny lustre.

Asbestos will not burn or melt. This makes it suitable for fireproof materials. We use it for insulation, fireproof shingles, fireproof curtains, and covering for hot pipes.

Asbestos is mined in Quebec, Arizona, Rhodesia and the Asbestos Mountain of South Africa.







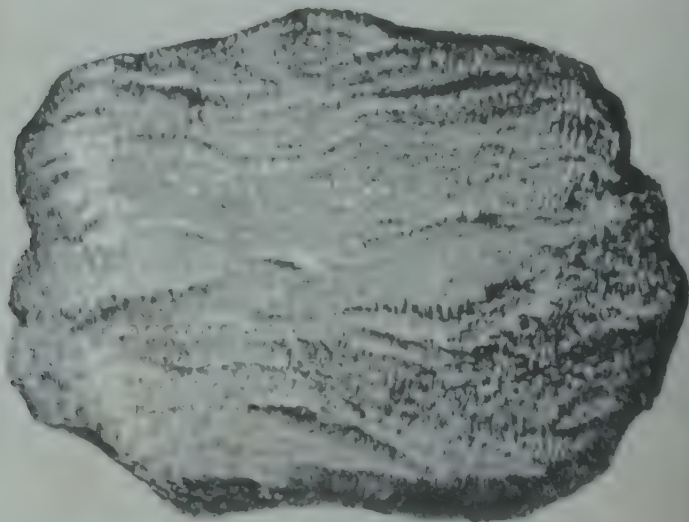
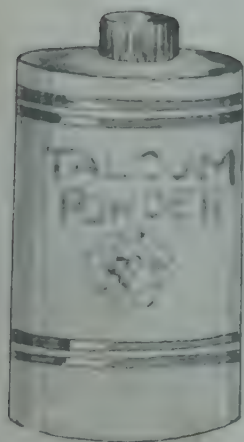
## TALC

Talc is one of the softest minerals. It can be easily cut with a knife or scratched with the fingernail. Its colour is white, green or grey, and it has a pearly lustre. Fresh pieces feel soapy or greasy. That is why some varieties are called soapstone.

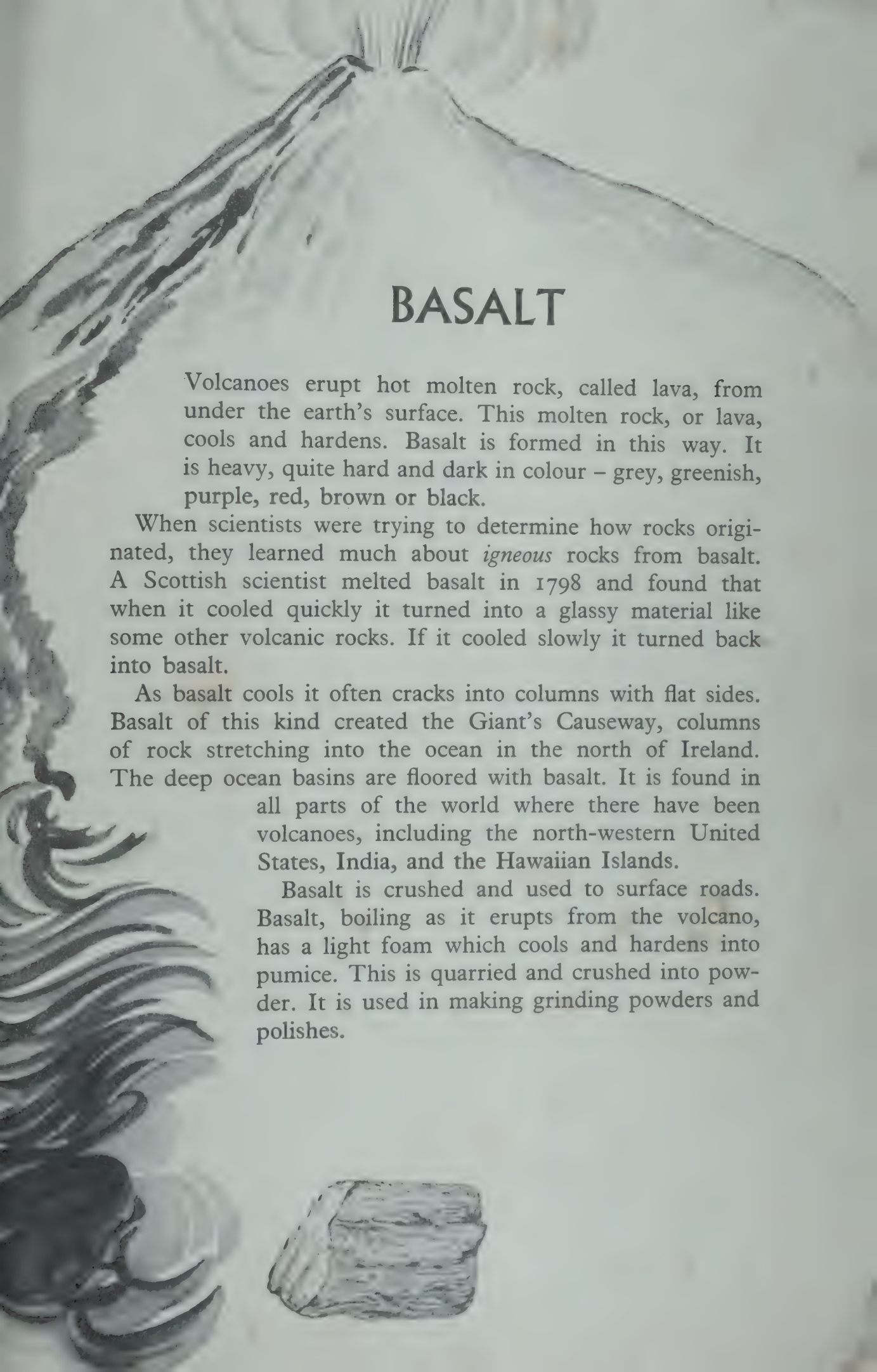
As soapstone it was used by the ancient Chinese to make images and ornaments. The Babylonians carved seals from it. Soapstone figurines were cut by the Egyptians and given a glazed finish. Carvings have been found in ancient ruins in Rhodesia. The Indians of North America found it could be cut and hollowed to form bowls and jars. They also made and smoked soapstone pipes.

One variety, called French chalk by tailors, is used for marking cloth. In Burma it is cut into pencils for writing on black paper.

Pure talc is ground and used to make talcum powder. It is also used in making paper, paint, roofing, rubber, soap and crayons. There are important talc deposits in the eastern United States. It is found in *metamorphic* rocks.







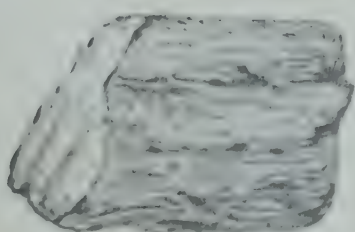
# BASALT

Volcanoes erupt hot molten rock, called lava, from under the earth's surface. This molten rock, or lava, cools and hardens. Basalt is formed in this way. It is heavy, quite hard and dark in colour – grey, greenish, purple, red, brown or black.

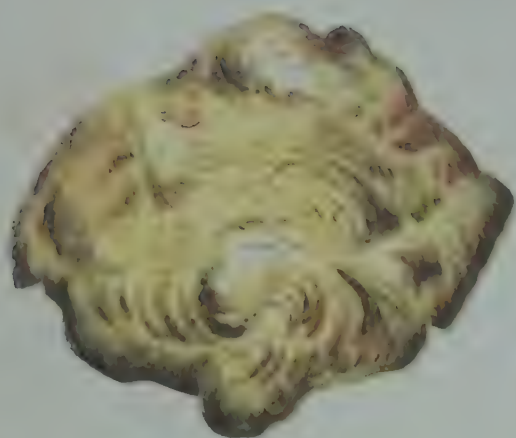
When scientists were trying to determine how rocks originated, they learned much about *igneous* rocks from basalt. A Scottish scientist melted basalt in 1798 and found that when it cooled quickly it turned into a glassy material like some other volcanic rocks. If it cooled slowly it turned back into basalt.

As basalt cools it often cracks into columns with flat sides. Basalt of this kind created the Giant's Causeway, columns of rock stretching into the ocean in the north of Ireland. The deep ocean basins are floored with basalt. It is found in all parts of the world where there have been volcanoes, including the north-western United States, India, and the Hawaiian Islands.

Basalt is crushed and used to surface roads. Basalt, boiling as it erupts from the volcano, has a light foam which cools and hardens into pumice. This is quarried and crushed into powder. It is used in making grinding powders and polishes.







# AMBER

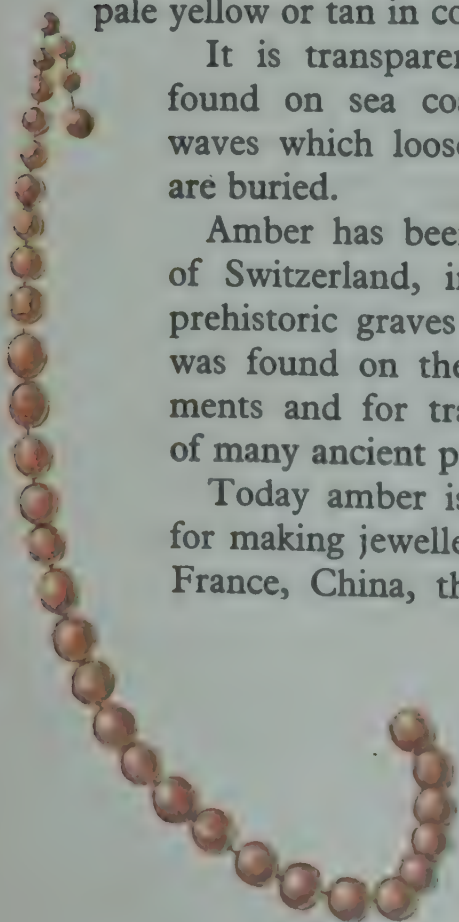
Amber was once a gum or resin which oozed from ancient pine trees. It was buried and became a fossil. Sometimes insects or flowers can be seen in amber where they were caught in the gum. Amber is pale yellow or tan in colour but rarer forms are reddish.

It is transparent. Rounded, irregular lumps of amber are found on sea coasts where they are washed ashore by the waves which loosen them from the rock layers in which they are buried.

Amber has been found among the remains of cave dwellers of Switzerland, in Assyrian and Egyptian ruins, and in the prehistoric graves of the Greeks. Since the Stone Age, amber was found on the shores of the Baltic. It was used for ornaments and for trading and found its way into the possession of many ancient peoples.

Today amber is mined from the Baltic deposits and is used for making jewellery. It is also found along the shores of Sicily, France, China, the Adriatic, and occasionally North America.

The Greek name for amber is electron, from which our word electricity comes. The Greeks found that by rubbing amber it acquired an electric charge.







## JADE

Jade is a hard mineral with a glassy lustre when polished. There are two forms of jade. Jadeite is often found as water-worn pebbles, and nephrite in *metamorphic* rocks.

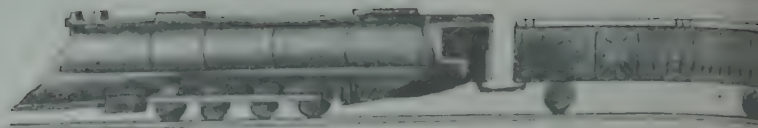
During the Stone and Bronze Ages, jade was carved into knives, daggers, hammers, ornaments and musical instruments. Such objects have been found in prehistoric ruins.

Some say jade was first dug in China. The Chinese have valued jade for many centuries. Since medieval times they have been masters in the art of jade carving. They prefer jade which is rare and unusual in colour, such as pure white mottled with grass green, contrary to the belief that the brilliant "imperial" green is most popular. Milky white with red spots is another variety. To the Chinese, jade is a symbol for charity, modesty, courage and wisdom.

Among the other places where jade is found are Alaska, British Columbia, Mexico, Germany, and Siberia. Burma and Turkey have been famous jade producers since early times. New Zealand natives still make tools of nephrite.







# IRON

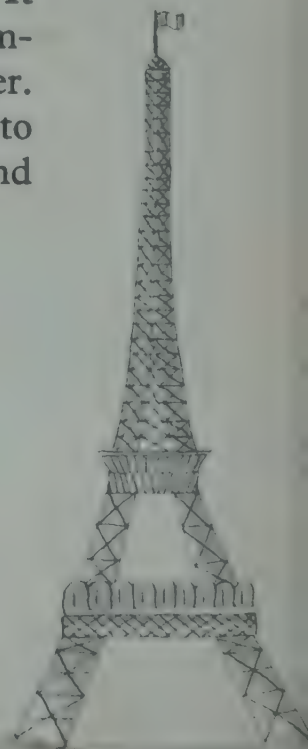
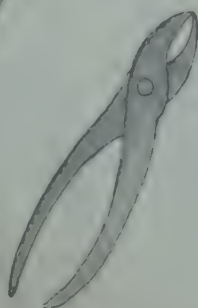
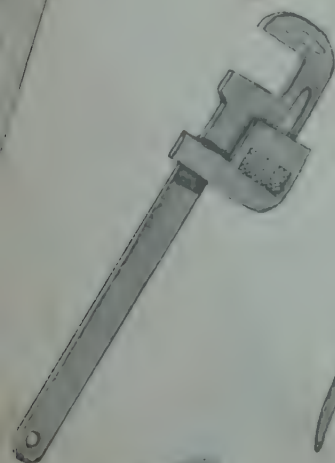
Iron is one of the most important metals in history and has been in use for about 3,000 years. It is found in many parts of the world.

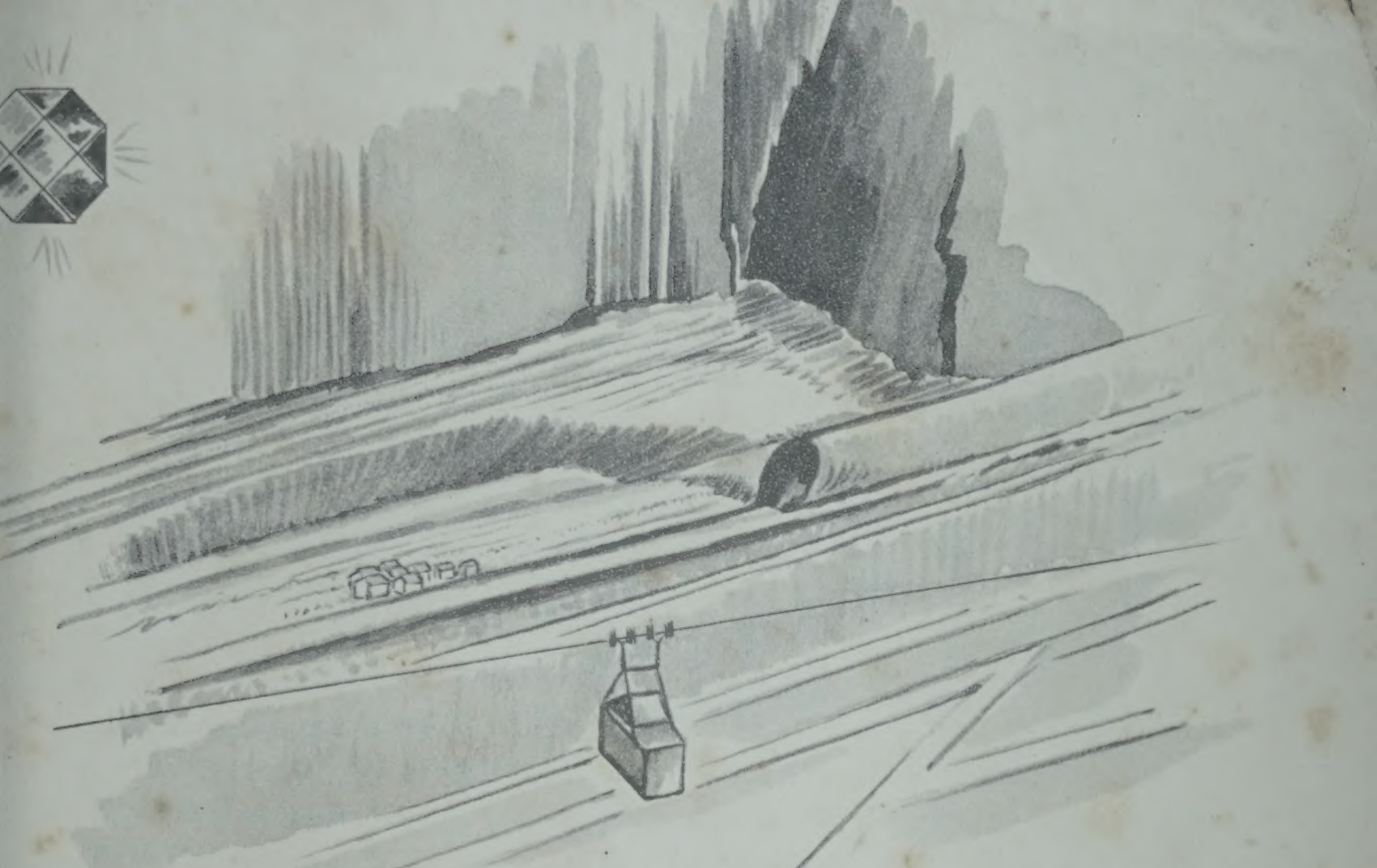
We get most of our iron from hematite, an ore in beds of *sedimentary* origin and in veins of *igneous* rocks. Hematite is reddish in colour. Iron compounds colour many stones and soil.

Iron has to be taken out of ore. Ore is a rock that contains metal. Chunks of pure iron do not occur on the earth and only rarely are minute grains found. Meteorites, or shooting stars, that drop from the sky usually consist of nickel and iron. However, on Disco Island, Greenland, there is rock in which boulders of native iron are found.

There is an iron ore called magnetite which has magnetic qualities and which acts the same way as the popularly known magnets.

In its pure form, iron is silver-grey. It is very hard, durable and strong. Combined with other metals it is even stronger. Yet it can be shaped easily and made to spring and bend. Many items, large and small, are made of iron.





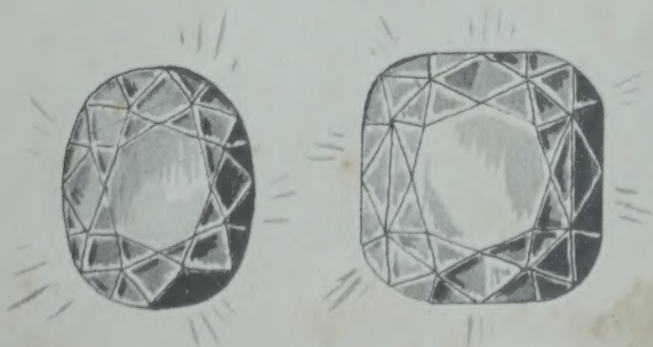
## DIAMOND

The diamond, formed in volcanoes, is pure carbon in eight-sided crystals. It is the hardest of all minerals. It is colourless to yellow, brown, green, blue, and grey. Though not the rarest, it is the most popular of all gems.

The immense Kimberley mines in South Africa produce most of the world's diamonds. Some have been found in Borneo, Brazil, India and Australia, and a few in Arkansas.

There are many famous diamonds, like the Cullinan, Hope and the Koh-i-nor, which have romantic and interesting stories woven about them. Many have become crown jewels.

Diamonds are cut and polished to increase their brilliancy. Amsterdam, Holland, is the centre for this work. Only 20 per cent of all diamonds mined are suitable for gems. Chips, cloudy and imperfect diamonds are used for making glass-cutting tools, for rock drills, precision instruments, and abrasive powders.







## RUBY

Clear and colourless crystals of corundum are known as the "Oriental White Sapphire"; when tinged with blue or pink they are sapphires; when yellow, the "Oriental topaz"; when green, the "Oriental emerald"; when purple, the "Oriental amethyst"; and when red, they are called the ruby.

Rubies of clear and deep colour are the rarest of all gems, being valued about three times as much as diamonds of equal size. The most-sought-for shade is "pigeon-blood red".

In ancient lore the ruby is termed "lord of stones" and "gem of gems". It was supposed to protect its wearer so that he was safe from injury in peace or war.

The best rubies come from Burma, where there are ancient mines on limestone hillsides. A handful of pebbles from river beds in this region may show all the colours of the rainbow. For generations people of Burma have hunted in the gravels for these precious stones. Sometimes huge rubies are found.

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